Diabetic Retinopathy

John H. Drouilhet MD

Diabetic Retinopathy is the leading cause of new blindness in the 25 to 74 year age group in the United States. The diabetic patient has a twenty-five times greater risk of developing blindness than the non-diabetic patient. Only 50 % of all patients with diabetes mellitus have actually been diagnosed.[1] The Community Epidemiologic Work Group for Diabetes Mellitus in Hawaii showed a prevalence of 25.2 per 1000 to 63 per 1000 persons based on self-reported data. The State Blind Registry for 1992-1993 showed diabetic retinopathy as the second leading cause of all new blind cases (20.9%).[2] Diabetic retinopathy is a significant cause for concern in Hawaii in regard to patient quality of life and socioeconomic concerns.

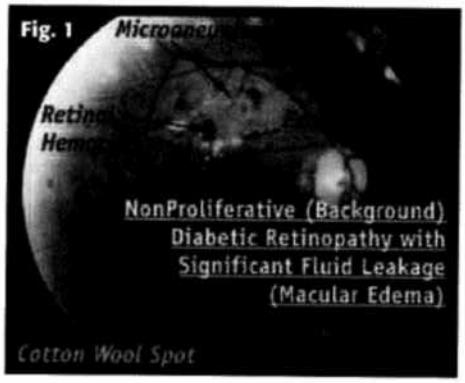
Various factors have been studied in the pathophysiology of Diabetic Retinopathy to include aldose reductase, growth hormone, blood rheology abnormalities, blood viscosity,[1] vascular endothelial growth factor,[3] etc. It is as yet not fully understood how much each of these (or other unknown factors) contributes to the retinal vascular disease process.

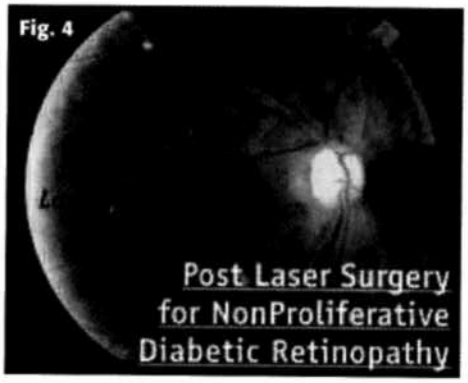
Duration of diabetes mellitus is critical relative to the onset of retinopathy. Type I diabetics usually have no retinopathy until five years after diagnosis. By 15 years into the disease 90% will have retinopathy. Type II diabetics can present with retinopathy on initial diagnosis. The recommendation for dilated eye examination in the Type I diabetic is yearly once the patient has had diabetes for five years. Type II diabetics should be examined yearly from time of diagnosis.[1]

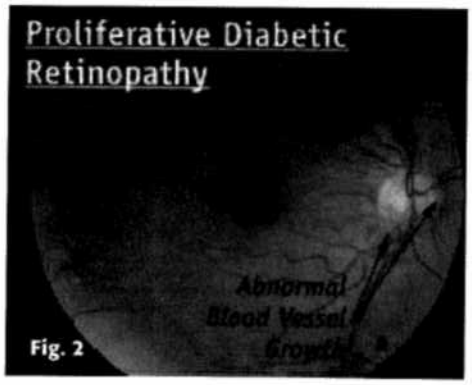
Definite risk factors for diabetic retinopathy include duration of disease, poor glucose control, hypertension, and renal disease.[4] As 87% of patients with advanced retinopathy have nephropathy and/or neuropathy, patients with nephropathy and /or neuropathy definitely need an ophthalmologic exam.[5]

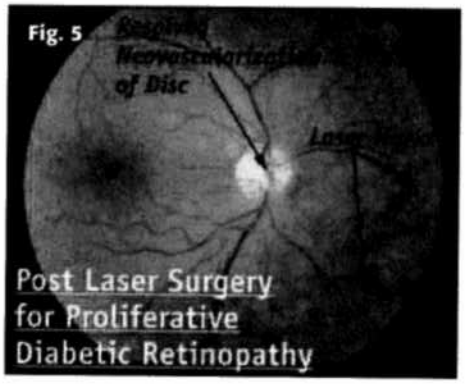
Diabetic Retinopathy has two major classifications—Non-Proliferative Diabetic Retinopathy (NPDR) and Proliferative Diabetic Retinopathy (PDR).[1] In NPDR one sees retinal microaneurysms, blot hemorrhages, cotton wool spots, intraretinal microvascular abnormalities, and retinal edema (Fig 1). Edema affecting the macula causes loss of central (reading) vision. PDR is the more advanced stage occurring when the retina starts to lose its blood supply. The eye responds by growing new blood vessels on the optic nerve or retina (Fig 2). These fragile new vessels bleed, filling the vitreous cavity. Scar tissue accompanies the neovascularization and can cause retinal detachment (Fig 3).

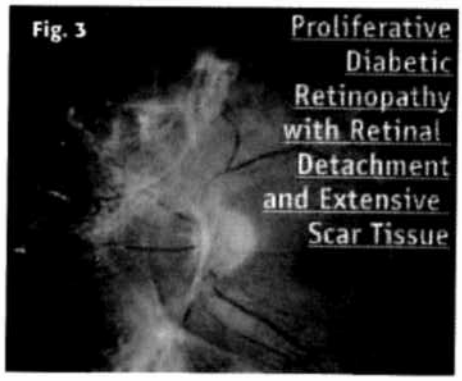
To combat Diabetic Retinopathy, surgical strategies were developed in which Laser surgery treats macular edema and causes atrophy of the neovascularization. Vitrectomy surgery removes

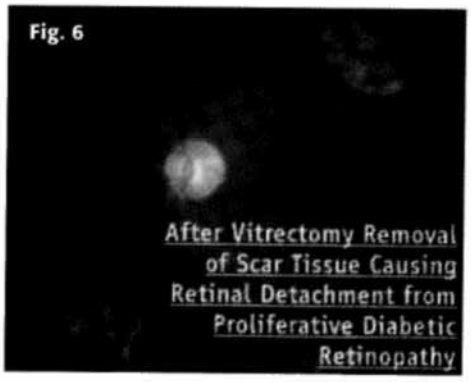












dense vitreous hemorrhage and relieves traction retinal detachment from scarring.

The Early Treatment Diabetic Retinopathy Study (ETDRS)[6] demonstrated a 50% reduction in loss of vision with appropriate laser surgery for clinically significant macular edema (Fig 4). This study also showed that aspirin did not reduce progression of diabetic retinopathy nor increase the risk of vision loss from vitreous hemorrhage.[7] The Diabetic Retinopathy Study showed a 50-60% reduction in vision loss for timely laser surgery in patients with Proliferative Diabetic Retinopathy (Fig 5).[8] The Diabetic Retinopathy Vitrectomy Study showed better visual result with early vitrectomy surgery in Type I Diabetics with nonclearing vitreous hemorrhage (Fig 6).[9]

The Diabetes Control and Complications Trial (DCCT) showed delay in onset and slower progression of Diabetic Retinopathy, nephropathy, and neuropathy. There was a 50% reduction in amount of laser surgery for Diabetic Retinopathy in tightly controlled diabetics.[10]

Diabetic Retinopathy is the major cause of new blindness in working Americans. The longer the duration of diabetes, the greater the risk of retinopathy. Excellent serum glucose, blood pressure, and cholesterol control[11] delay and decrease the severity of retinopathy. Timely laser surgery reduces vision loss by 50%. It is the responsibility of all physicians in partnership to diagnose and properly manage the diabetic patient.

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Correction

Please note that the above manuscript on Diabetic Retinopathy by John H. Drouilhet MD, was originally published *(Haw Med. J. 1997;56:241-244)* with incorrect illustrations. We reprint the corrected manuscript and illustrations in its entirety. We apologize to the author and to the reader for the error.